

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) An apparatus used with an electronic camera of the type associated with an electronic shutter which controls an image sensor, the apparatus comprising image size detection circuitry, which is responsive to electrical signals received from the electronic camera and to changes in an actual image area within a total image area, for

continuously identifying the actual image area within the total image area of the image sensor, and generating a control signal, ~~based on the actual image area determined from a luminance signal component having a signal level greater than a predetermined threshold over an average duration proportional to the actual image area, for controlling the electronic shutter based on an average duration that a luminance signal component is greater than a predetermined threshold, the average duration being proportional to the actual image area; and~~
controlling the electronic shutter using the control signal.

2. (Original) The apparatus of claim 1 wherein the electronic camera has a plurality of predefined shutter response areas, each shutter response area defining different portions of the total image area of the image sensor, said control signal selecting one of the shutter response areas, and said electronic shutter controlling said image sensor in response to the selected one of the shutter response areas.

3. (Original) The apparatus of claim 2 further comprising a processor and a memory for storing data associated with the plurality of predefined shutter response areas of the electronic camera.

4. (Previously Presented) The apparatus of claim 3 wherein the electrical signals includes a luminance component used by the image size detection circuitry to identify the portion of the total image area of the image sensor containing the actual image.

5. (Original) The apparatus of claim 4 wherein the image detection circuitry includes:

a comparator configured to receive the luminance component of the electrical signals and generate a first output signal representative of a portion of the total image area;

an integrator, connected to the comparator, for receiving the first output signal from the comparator and generating a second output signal representative of the actual image area; and

an analog to digital converter which receives the second output signal from the integrator and generates a digital signal, representative of the actual image area for selecting data associated with one of the plurality of predefined shutter response areas stored in said memory.

6. (Original) The apparatus of claim 1 wherein the image sensor includes a charge-coupled device having an array of photoelectric cells.

7. (Currently Amended) A medical instrumentation system comprising:
a medical viewing instrument for viewing an object under observation;
an electronic camera optically coupled to the medical viewing instrument, for generating electrical signals representative of an actual image viewed by the electronic camera said electronic camera associated with an electronic shutter which controls an image sensor;

image size detection circuitry, responsive to electrical signals received from the electronic camera and to changes in an actual image area within a total image area, for

continuously identifying the actual image area within the total image area of the image sensor, and generating a control signal, ~~based on the actual image area determined from a luminance signal component having a signal level greater than a predetermined threshold over an average duration proportional to the actual image area, for controlling the electronic shutter based on an average duration that a luminance signal component is greater than a predetermined threshold, the average duration being proportional to the actual image area; and~~
controlling the electronic shutter using the control signal.

8. (Original) The medical instrumentation system of claim 7 wherein the electronic camera has a plurality of predefined shutter response areas, each shutter response area defining different portions of the total image area of the image sensor, said control signal selecting one of the shutter response area, and said electronic shutter controlling said image sensor in response to the selected one of the shutter response areas.

9. (Original) The medical instrumentation system of claim 8 further comprising a processor and a memory for storing data associated with the plurality of predefined shutter response areas of the electronic camera.

10. (Previously Presented) The medical instrumentation system of claim 9 wherein the electrical signals includes a luminance component used by the image size detection circuitry to identify the portion of the total image area of the image sensor containing the actual image.

11. (Original) The medical instrumentation system of claim 10 wherein the image detection circuitry includes:

a comparator configured to receive the luminance component of the electrical signals and generate a first output signal representative of a portion of the total image area;

an integrator, connected to the comparator, for receiving the first output signal from the comparator and generating a second output signal representative of the actual image area; and

an analog to digital converter which receives the second output signal from the integrator and generates a digital signal, representative of the actual image area for selecting data associated with one of the plurality of predefined shutter response areas stored in said memory.

12. (Original) The medical instrumentation system of claim 7 wherein the image sensor includes a charge-coupled device having an array of photoelectric cells.

13. (Currently Amended) A method of controlling an electronic shutter used with an image sensor of an electronic camera, the method comprising:

receiving electrical signals from the electronic camera,

continuously identifying, in response to the electrical signals and changes in an actual image area within a total image area, the actual image area within the total image area of the image sensor; and

~~generating a control signal, based on the actual image area determined from a luminance signal component having a signal level greater than a predetermined threshold over an average duration proportional to the actual image area, for controlling the electronic shutter based on an average duration that a luminance signal component is greater than a predetermined threshold, the average duration being proportional to the actual image area; and~~

controlling the electronic shutter using the control signal.

14. (Original) The method of claim 13 wherein the electronic camera has a plurality of predefined shutter response areas, each shutter response area defining different portions of the total image area of the image sensor, and controlling the electronic shutter further includes selecting one of the shutter response areas.

15. (Original) The method of claim 14 wherein the electrical signals includes a luminance component for determining the portion of the total image area of the image sensor containing the actual image.

16. (Previously Presented) The method of claim 15 wherein identifying an actual image area occupying a total image area of the image sensor includes:

comparing the luminance component of the electrical signals with a predetermined threshold value and generating a first analog output signal representative of a portion of the actual image area occupying the total image area;

integrating the first output signal and generating a second analog output signal representative of the actual image area; and

converting the second analog signal to a digital signal representative of the actual image area for selecting data associated with one of the plurality of predefined shutter response areas.

17. (Original) The method of claim 13 wherein the image sensor includes a charge-coupled device having an array of photoelectric cells.

18. (Currently Amended) An apparatus used with an electronic camera of the type associated with an electronic shutter which controls an image sensor, the apparatus comprising image size detection circuitry, which is responsive to image signals received from the electronic camera and to changes in an actual image area within a total image area, for

continuously measuring the active image area within the total image area of the image captured by the image sensor, and generating a control signal, ~~based on the active image area determined from a luminance signal component having a signal level greater than a predetermined threshold over an average duration proportional to the actual image area, for controlling the electronic shutter based on an average duration that a luminance signal~~

component is greater than a predetermined threshold, the average duration being proportional to the actual image area; and
controlling the electronic shutter using the control signal.

19. (Previously Presented) The apparatus of claim 18 wherein the electronic camera has a plurality of predefined shutter response areas, each shutter response area defining different portions of the total image area of the image sensor, said control signal selecting one of the shutter response areas, and said electronic shutter controlling said image sensor in response to the selected one of the shutter response areas.

20. (Previously Presented) The apparatus of claim 19 further comprising a processor and a memory for storing data associated with the plurality of predefined shutter response areas of the electronic camera.

21. (Previously Presented) The apparatus of claim 20 wherein the electrical signals includes a luminance component used by the image size detection circuitry to determine identify the portion of the total image area of the image sensor containing the active image.

22. (Previously Presented) The apparatus of claim 21 wherein the image detection circuitry includes:

a comparator configured to receive the luminance component of the electrical signals and generate a first output signal representative of a portion of the total image area;

an integrator, connected to the comparator, for receiving the first output signal from the comparator and generating a second output signal representative of the actual image area; and

an analog to digital converter which receives the second output signal from the integrator and generates a digital signal, representative of the actual image area for selecting data associated with one of the plurality of predefined shutter response areas stored in said memory.

Applicant : Michael Burnett et al.
Serial No. : 09/177,837
Filed : October 23, 1998
Page : 8 of 9

Attorney's Docket No.: 00167-318001
Client Ref.: 02-31-0258

23. (Previously Presented) The apparatus of claim 18 wherein the image sensor includes a charge-coupled device having an array of photoelectric cells.